



Conserve O Gram

July 1993

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Calibration Of Hygrometers And Hygrothermographs

The National Park Service uses thermometers, hygrometers, hygrothermographs, and data-loggers to monitor relative humidity (RH) and temperature conditions in museum collection storage and exhibit areas. This *Conserve O Gram* explains how hygrometers and hygrothermographs can be calibrated.

A hygrometer is a direct-read, humidity-sensing instrument incorporating an element of hygroscopic (i.e., moisture absorbing and releasing) material that dimensionally changes according to humidity conditions. The hygroscopic element moves a pointer on the dial face to indicate RH. A hygrothermograph is a recording instrument that continuously marks RH and temperature conditions on a rotating chart for durations of either one day, one week, one month, or two months. A hygrothermograph utilizes a hygroscopic RH sensor and a bimetal temperature sensor.

In order for humidity-sensing instruments to accurately sense and record conditions, they require routine calibration. Instruments using hygroscopic sensing elements have a tendency to drift from a set point. It is recommended that hygrometers and hygrothermographs be calibrated at least quarterly, preferably monthly. When environmental conditions change rapidly or dramatically in an area being monitored, it may be necessary to check calibration even more often.

The calibration process involves checking instrument readings against actual RH and/or

temperature conditions and making adjustments as necessary. A psychrometer (either sling or aspirated) or an electronic hygrometer/thermometer can be used to measure actual RH and temperature conditions in the vicinity of the instrument being calibrated. The psychrometer must be used properly to achieve accurate readings (see *Conserve O Gram 3/1*). Once the true relative humidity and temperature are determined, the hygrometer or hygrothermograph is adjusted to reflect them.

Repeating the calibration process 10 to 20 minutes after the initial calibration will determine if, because of play in instrument linkages, additional small adjustments are necessary so that the instrument will more accurately record actual conditions.

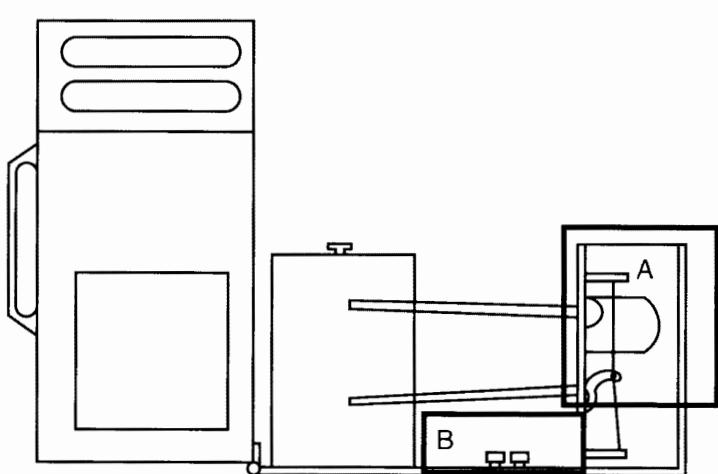
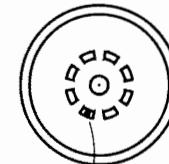
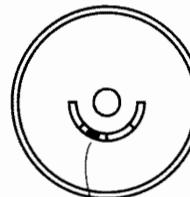
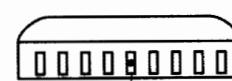
The hygrothermographs and hygrometers used in the National Park Service are manufactured by a number of companies. Because adjustment methods are peculiar to each instrument, the table on page 2 is provided as a guide to indicate the location of adjustment devices on the different brands of instruments in common use in the Service, how adjustments are made, and what tools, if any, are needed for making adjustments.

Donald R. Cumberland, Jr.
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 <p>Hygrothermograph</p>					 <p>Tab Adjustment</p> <p>Hygrometer 1 (Back View)</p>  <p>Tab Adjustment</p> <p>Hygrometer 2 (Back View)</p>  <p>Screw Adjustment</p> <p>Hygrometer 3 (Side View)</p>				
<p align="center">HYGROTHERMOGRAPH</p>					<p align="center">HYGROMETER</p>				
MANUFACTURER	MODEL	ADJUSTMENT ILLUSTRATION	ADJUSTMENT DEVICE	ADJUSTMENT TOOL NEEDED	MANUFACTURER	MODEL	ADJUSTMENT ILLUSTRATION	ADJUSTMENT DEVICE	ADJUSTMENT TOOL NEEDED
BELFORT	5-594	AREA B	ADJUSTMENT KNOBS	NONE	AIRGUIDE	605	HYGROMETER 1	SLIDING METAL TAB	BALLPOINT PEN OR STYLUS
WEATHERMEASURE	H-311	AREA A	ADJUSTMENT KNOBS	NONE	AIRGUIDE	113	HYGROMETER 2	SLIDING METAL TAB	BALLPOINT PEN OR STYLUS
QUALIMETRICS	5023	AREA A	SQUARED SHAFTS	ADJUSTMENT KEY	PASTORELLI & RAPKIN	2-INCH	HYGROMETER 3	ADJUSTMENT SCREW	STRAIGHT SLOT SCREWDRIVER
SIERRA-MISCO	2004	AREA A	ADJUSTMENT SCREWS	PHILLIPS SCREWDRIVER	ABBEON-CAL	MZAY	HYGROMETER 3	ADJUSTMENT SCREW	STRAIGHT SLOT SCREWDRIVER
COLE-PARMER	37250-00	AREA A	ADJUSTMENT SCREWS	SCREWDRIVER					

Consult the instrument manual for more in-depth information. If unavailable in the park, instructions may be requested from Curatorial Services Division, WASO.